Chapter 4: Refuge Management

Current Refuge Programs

Habitat Management

Management of Refuge habitats involves a variety of techniques to control and enhance habitat conditions. The primary objective of habitat management is to provide fish and wildlife with diverse habitats to meet a variety of requirements for resting, feeding, and nesting.

Photo by Ed DeVries

In addition to direct manipulation of habitats, other Refuge activities indirectly support habitat management. Dike maintenance, for instance, facilitates water management, as does the maintenance of water control structures and pumps. Similarly, trapping for muskrats is permitted on the Refuge because high numbers of muskrats can cause extensive damage to dikes with their burrows. Trappers bid for the opportunity to trap on the Refuge. During the 1998 season, two trappers visited the Refuge 90 times, spent 287 hours trapping and removed 1,185 muskrats.

Wetland Management

Wetland habitats on Shiawassee National Wildlife Refuge include moist soil units, marshes, greentree reservoirs, open water pools, rivers, and stream habitats. The Refuge currently protects and manages 3,479 acres of wetland habitats. The Refuge staff manipulate water levels in the wetlands to affect habitat structure and waterbird use. However, the level of the Saginaw Bay and River affects the Refuge staff's ability to manipulate water levels in Refuge wetlands and, at its highest levels, floods the Refuge.

Most wetland habitats on the Refuge occur in distinct units. The Trinklein Units, however, offer a blend of habitats including moist soil, emergent marsh, and grassland. The acreage for each unit is displayed in Table 2. The location of the units is shown in Figure 4.1.

Moist Soil Units

In a normal year the water level is lowered during the summer to establish moist-soil vegetation. After plants are established in the summer, the unit is gradually reflooded in the fall to optimize use of the seed resources. During the spring the water level will gradually be lowered for use by migrating waterfowl, shorebirds, and waders. Four moist soil units total 385 acres.

Figure 4.1: Locations of Management Units

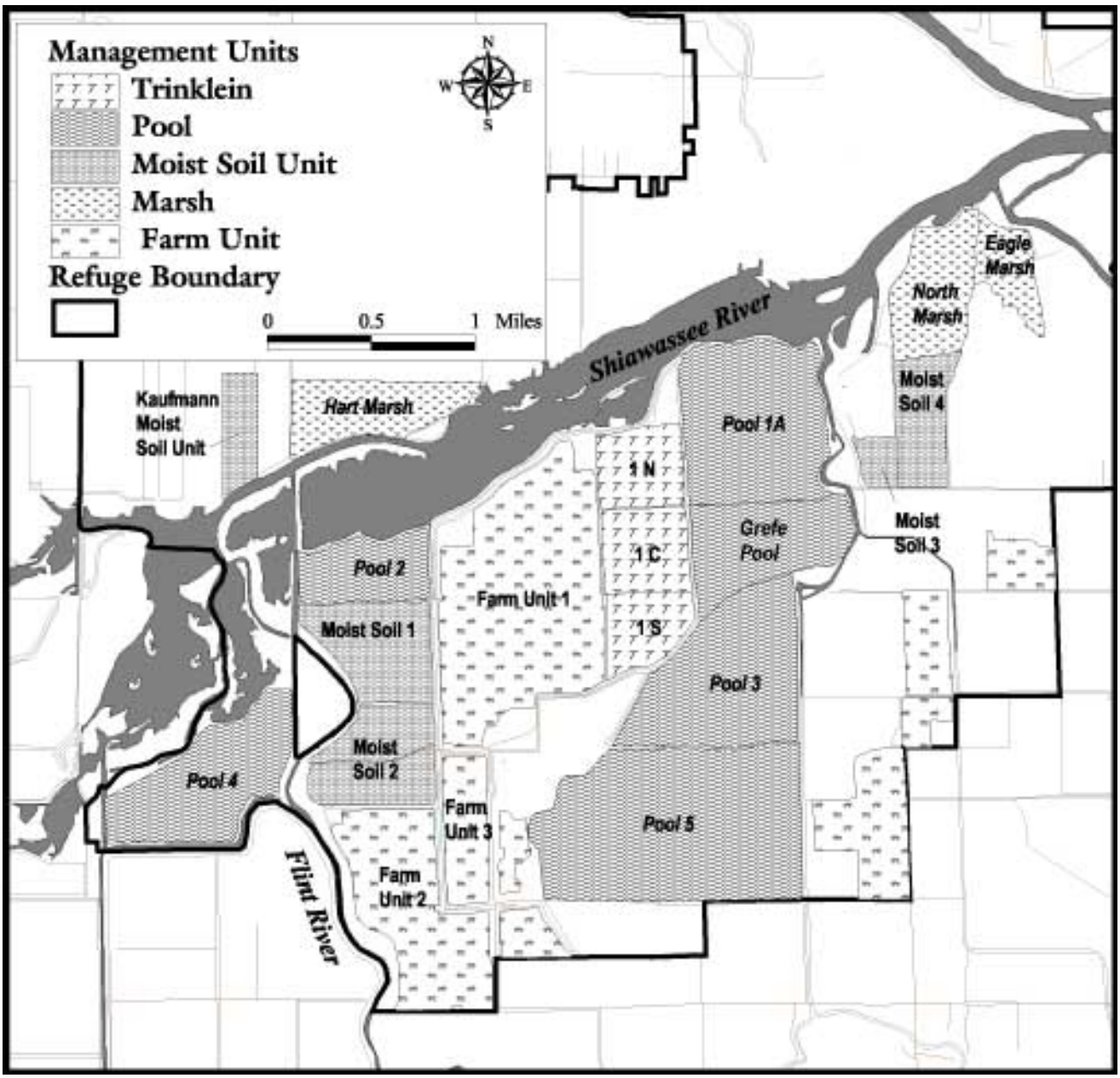


Table 2: Acreage of Management Units on Shiawassee National Wildlife Refuge

Wetland Units

Unit	Acreage	Unit	Acreage
Moist Soil Unit 1	137	Pool 5	520
Moist Soil Unit 2	75	Hart Marsh	90
Moist Soil Unit 3	92	North Marsh	113
Moist Soil Unit 4	82	Eagle Marsh	56
Pool 1A	315	Kaufman Marsh	51
Grefe Pool	190	Trinklein 1N	91
Pool 2	115	Trinklein 1C	79
Pool 3	300	Trinklein 1S	71
Pool 4	444	Rivers and associated Marsh	950

Grassland Tracts

Unit	Acreage
Switchgrass Unit	78
Schrems	61

Marshes

Marshes are important for waterfowl. The vegetation in marshes provides seeds, tubers, and browse. The vegetation also provides nest sites. The optimum mix in a semi-permanent marsh is 50 percent vegetation cover and 50 percent water. The 50:50 mix produces the maximum diversity and number of birds. In addition, the mix provides ideal nesting cover for waterbirds and substrates for invertebrates, which waterfowl and shorebirds also feed on. Refuge staff manipulate water levels and use prescribed fires to alter the vegetation structure in the marshes and to make food resources available to migratory birds. Pools 2 and 4 and the North Marsh provide emergent marsh habitat and total 672 acres.

Open Water Pools

Open water pools serve as loafing areas for waterfowl, year round habitat for marsh birds, and occasional seasonal habitat for shorebirds. In normal years, water levels are maintained about 2 feet deep in the spring and fall to provide a feeding and loafing area for migrating diving ducks. Summer water levels vary from year to year depending on how the Refuge staff wants to alter the vegetation structure in the pools. Pools 1a, 2, 4 and Grefe Pool are capable of being managed as open water pools and total 700 acres.

Greentree Reservoirs

The bottomland hardwood forests that have dikes around them function as greentree reservoirs. The intent is to flood the area during the spring and fall migrations to provide a feeding and loafing area. In normal years the Refuge staff try to flood the forests during the spring and fall, but not leave the area flooded too long. If the area is flooded too long, the trees will be stressed and killed. The two greentree reservoir units on the Refuge total 820 acres.

Forests

The forests on the Refuge are used by deer, squirrels, raccoons, hawks, owls, and a variety of forest interior bird species. The forests have been affected by the large number of deer in the past. Heavy browsing by the deer has decreased the regeneration of the forest. Since the deer numbers have been reduced, some seedlings have shown significant growth. The Refuge staff have attempted to supplement regeneration by planting seedlings. Floods have killed most of the new seedlings, however. The goal has been to create a two-tiered canopy of mast and cavity producing trees without jeopardizing populations of forest interior birds. The Refuge has a total of 3,519 acres of forested habitat, which does not include the greentree reservoir units.

Croplands

Cropland on the Refuge is farmed through cooperative farming agreements with four farmers. The primary objective of the cooperative farming program has been to provide food for waterfowl during the spring and fall migrations. Approximately half of the total acreage also supports the managed goose hunt. Narrow strips of winter wheat are planted adjacent to corn strips that serve as cover for hunters. The fields are in a soybean, corn, and barley/clover or winter wheat rotation. After farmers have harvested their share of the agricultural crops, birds have the opportunity to glean waste grains from the fields. The Refuge crop share of 30 percent is left standing in the field through winter and used as a food for early spring migrants. The Refuge has 1,182 acres in cropland.

Grasslands

Refuge grasslands are used in the spring and fall by migrating grassland bird species. Ducks and geese also nest in the grassland. The chief management concern related to grasslands is the invasion of shrubs, trees, and noxious weeds into the grassland. Prescribed fire is the primary management tool used in maintaining grasslands. The Refuge has 580 acres of grasslands.

Photo by Myles Willard

Fish and Wildlife Monitoring

Refuge staff and volunteers currently use 16 surveys to monitor wildlife use throughout the year. The surveys provide information for Refuge management and support state and national efforts. Data from the surveys are maintained in the Refuge files and forwarded to others when appropriate.

In addition to the long-term monitoring projects, in a collaborative effort with the Alpena Fishery Resources Office and local sportsmen and conservation groups, the Refuge has developed shorter term fish survey projects. The first project assessed the presence of two new exotics – the Ruffe and Round goby – and two endangered species in Refuge waters. The second project assessed spawning activity of certain game and forage fish in the Refuge wetlands.

Waterfowl

Mid-December Goose Count – In coordination with the Michigan DNR, geese are counted over a standard route in this one-day survey. The data are forwarded to the DNR, which uses the data to evaluate both flyway and local goose populations.

Goose Neck Collar Survey – The data are collected during the bi-weekly waterfowl counts and submitted to the Service to provide information on the migration and population of Canada geese.

Photo by Kim LeBlanc

Mid-Winter Waterfowl Survey – Data are gathered on a onetime count over a standard route and forwarded to the Service. The Service uses the data to provide information on population trends for some species' winter distribution.

Bi-weekly Waterfowl Count – All waterfowl species are counted over a standard route for the entire year. During peak use, the counts may be conducted weekly. The data are provided to the DNR, and the Refuge uses the data for evaluating habitat management and trends in use.

Waterfowl Brood Survey – All waterfowl broods are counted over a standard route three times between April and early July. The data are used by Refuge staff to assess habitat conditions for waterfowl production.

Wood Duck Nesting Box Survey – Volunteers visit the boxes during the winter to gather the data and prepare the boxes for the coming spring. The data, which are used for population information, are forwarded to the Service.

Wood Duck Breeding Bird survey Route – Once a year in late May, a count is conducted along a standard 25-mile route. The data are submitted to the Service and are used in a national effort to assess the population trends of wood ducks.

Marsh Birds and Shorebirds

Woodcock Singing Ground Survey – One time in April, a standard survey is conducted off-Refuge. The data are forwarded to the Service. The Service uses the data to provide an index to woodcock abundance and to estimate woodcock population trends for states, provinces, management regions, and the continent.

Marsh Bird Call Survey – Twice during May through July data are collected along a standard route. Refuge staff use the data to assess the breeding populations, trends, and habitat condition.

International Shorebird Survey – Volunteers collect data biweekly along a standard route weekly or, at a minimum, every 10 days throughout the shorebird migration period, which is typically from late March until late November. The data are forwarded to the Manomet Observatory for Conservation Sciences in Manomet, Massachusetts. The Center staff use the data to map migration routes, timing, and staging areas and to monitor shorebird population trends.

Passerine/Neotropical Migrants

Bi-weekly Migratory Bird Survey – All birds, excluding waterfowl, are counted over a standard route year-round. Refuge staff use the data to monitor trends in bird use and assess habitat and management. Portions of the survey are reported to national, state or local data bases, including the Michigan Seasonal Bird Survey.

Forest Interior Point Counts of Breeding Birds – Refuge staff conduct the count once during June. Approximately 15 points are visited. Data is used to assess the neo-tropical forest interior breeding bird use, trends, and habitat conditions.

MAPS – In 1999, Refuge volunteers began Monitoring Avian Productivity and Survivorship (MAPS) studies on the Refuge. MAPS uses mist nets and point counts to determine the breeding success and survival rates of selected songbird species, which helps the Refuge staff to understand the population dynamics of these and similar species. This provides insights into the causes of population changes. (See http://www.im.nbs.gov/maps/cover.html for a description of MAPS.)

Raptors

Mid-Winter Bald Eagle Survey – The count occurs along a standard route on one day in January. The survey is coordinated with the Michigan DNR as part of a national effort. The Snake River Field Station of the USGS analyzes the data to provide information on eagle population trends, distribution, and habitat.

Amphibians

Michigan Frog and Toad Survey – A volunteer collects data three times annually during the breeding season at standard sites in the south central portion of the Refuge. The data are submitted to the Michigan DNR Natural Heritage Division, which uses the data to monitor frog and toad populations in the State of Michigan.

White-tailed Deer

White-tailed Deer Sex Ratio Counts – Once a month from late May to September, Refuge staff count deer along a standard route. Refuge staff use the data in management of the deer herd.

Winter Aerial Deer Count – The Michigan DNR conducts the count and submits the data to the Refuge. Refuge staff use the data to estimate the deer population.

Photo by Myles Willard

Habitat Monitoring

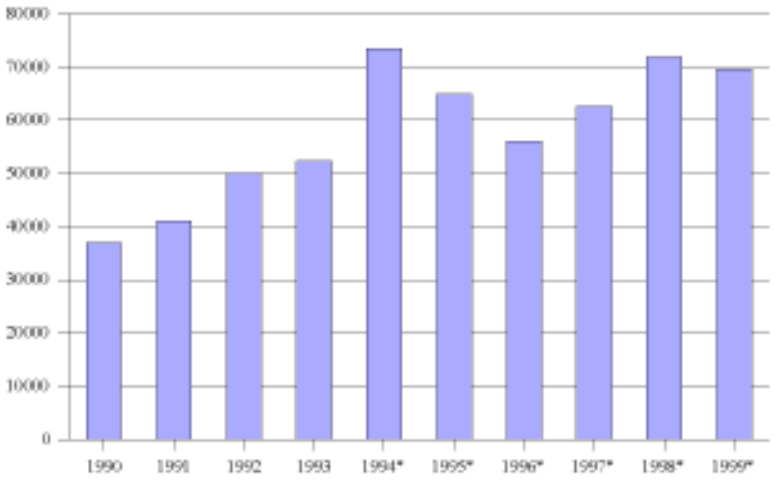
The Refuge conducts little formal habitat monitoring. Vegetation is measured along line transects before and after prescribed burns. When deer numbers were high on the Refuge, deer browse surveys were conducted. Now that deer numbers are lower and vegetation is beginning to respond, formal browse surveys are no longer conducted.

Public Use

Public use at Shiawassee National Wildlife Refuge has grown steadily over the last decade. Figure 4.2 depicts estimates for total Refuge visits over the past 9 years. These numbers represent all visitors to the Refuge. They are based on estimates by the Refuge staff at parking lots and boat ramps.

In 1998, hunting, fishing, and trapping accounted for 6 percent of the total visitation. Hiking, bicycling, cross country skiing, wildlife observation, and photography accounted for 82 percent. Education accounted for 5 percent. The remaining 7 percent included administrative visits and group meetings.

Figure 4.2: Refuge Visits



* includes visits to Green Point Environmental Learning Center

Waterfowl Hunting

The Refuge currently holds a managed goose hunt. The Michigan DNR processes applications for two pre-registered goose hunts. In 1998, 1,013 visits were recorded for the goose hunts. Visitors spent 5,452 hours hunting. Hunters are charged a fee of $4 per day. Senior citizens are charged $2 per day. No change is envisioned in the fee program that helps defer administrative costs.

For the past 16 years, the State of Michigan has been permitted to administer a waterfowl hunting program in Pool 4 (Refuge land) and adjoining marshes.

Deer Hunting

The Refuge holds a managed deer hunt to help control the herd's size. The Michigan DNR handles the application process. In 1998, 581 hunters accounted for 1,232 visits and spent an estimated 8,671 hours pursuing deer. Deer hunters are charged a $10 fee.

Fishing

Although fishing is not allowed from dikes, banks or shorelines within the Refuge, the navigable rivers and drains that intersect the area attract fishing enthusiasts using watercraft. With the cooperation of the Alpena Fishery Resources Office and the Service's Recreational Fishing Program, the Refuge purchased an accessible dock to improve fishing opportunity on the Cass River. An estimated 2,050 anglers fished river waters within the Refuge in 1998.

Wildlife Observation

In 1998, an estimated 58,429 visits included hiking, bicycling, cross-country skiing, birdwatching, and nature photography.

Education/Interpretation

Green Point Nature Center (Center) was officially opened in 1978 by the City of Saginaw with support from the Michigan DNR, the Federal Land and Water Conservation Fund, and the City of Saginaw. During the past 10 years thousands of children and adults have learned about nature at the Center.

In a spending cut, the City of Saginaw closed the Green Point Nature Center in 1988. To protect and maintain the building, a city staff member kept an office at the Center. In September of 1993, the Service agreed to lease the Center from the City. In the following years, the Service continued to lease and operate the Center as the Green Point Environmental Learning Center. In 1998, the Service received a 99-year, renewable lease for the Center from the City as a part of the General Motors settlement. In addition, the Center will receive $520,000 in the year 2002 as part of the settlement.

Photo by Myles Willard

The Service's mission for the Green Point Environmental Learning Center is to provide environmental education and interpretation opportunities for the youth and adults of Saginaw and surrounding communities. All of its programs are based upon the theme "Water, Wildlife and You." Key program topics include the Great Lakes Ecosystem and migratory birds.

The addition of Green Point Environmental Learning Center has dramatically increased the educational use on the Refuge. An estimated 3,600 people visited the Center in 1994. Approximately 940 of these visitors were students who came to the Center for environmental education. In 1998, 6,744 people visited the Center and 3,556 people participated in environmental education programs on and off the Refuge.

Pest Management

Integrated management of invasive or pest plants, animals, and insects is a program on the Refuge in support of high quality habitats and human health. Our primary goal is to provide complex habitat structures to meet the nesting, feeding, and resting requirements of fish and wildlife.

We use a variety of techniques in the integrated management of invasive pests. The techniques include monitoring the invasive species, manual and mechanical manipulations, timing of activities, chemical and biological control techniques, and the introduction of competitive species.

Animal Pests

With high densities, white-tailed deer, muskrat, beaver, raccoons, and woodchucks can severely affect habitat quality or other species. Through management, the Refuge maintains acceptable densities of these species. The techniques used vary from mechanical operations such as water level manipulation and planting of lure crops to direct

removal by hunting and trapping. Other techniques include reinforcement of dikes and placing protective tubing around trees or placing chemical deterrents on trees or plants.

Plant Pests

Invasive or pest plants can affect many habitat types found at Shiawassee National Wildlife Refuge. Purple loosestrife, reed canary grass, and phragmites may invade wetlands; cottonwood and willow may invade moist soil units and grasslands, and buckthorn may displace more preferred woody species in forest. To reduce encroachment of these species, we use several management techniques - hand pulling individual plants, mowing, burning, water level manipulations, plowing, and chemical and biological applications. The technique we choose is influenced by management objectives, intensity of encroachment, best land use practices, cost, and timing of application.

Of particular note is our effort to provide and use biological control techniques against purple loosestrife. Beginning in 1996, we began a 5-year program to rear and then distribute Galerucella species beetles to areas being invaded by purple loosestrife. The beetle has been approved as a biological control agent by the U.S. Department of Agriculture, the Fish and Wildlife Service, and other federal and state agencies. Over the course of 4 years the Refuge reared between 75,000 and 100,000 beetles for release. The beetles were distributed on Shiawassee National Wildlife Refuge and two other federal refuges.

Management of Insect Pests

Insect pests can threaten Refuge habitats, the health of other wildlife, and human health. Examples of potential insect pests are gypsy moths and mosquitoes. Currently, the Refuge has agreements with partner agencies to treat these insects when outbreaks reach detrimental levels. We expect to change our approach to mosquito control. See the mosquito control section under 'Planned Refuge Programs.'

Archaeological and Cultural Resources

The Refuge Manager considers potential impacts of management activities on historic properties, archeological sites, traditional cultural properties, sacred sites, human remains and cultural materials. Prior to ground disturbing activities, the Refuge Manager informs the Regional Historic Preservation Officer in a timely manner to allow analysis, evaluation, consultation, and mitigation as necessary for every Refuge undertaking.

The Refuge has a museum and museum collections (art, ethnography, history, documents, botany, zoology, paleontology, geology, environmental samples and artifacts). Museum collections at the Refuge (including the Environmental Learning Center) include art, history, zoology, paleontology, and artifacts. These collections are managed under a Scope of Collection Statement (10-31-94). To date, four archeological investigations have produced artifacts from Refuge lands. Most artifacts are stored at six repositories; only one is under a cooperative agreement.

Archeological investigations and collecting are performed only in the public interest by qualified archeologists working under an Archaeological Resources Protection Act permit issued by the Regional Director. Refuge personnel take steps to prevent unauthorized collecting by the public, contractors, and Refuge personnel. Violations are reported to the Regional Historic Preservation Officer.

Special Management Areas

Partners for Fish and Wildlife Program

The Refuge's Private Lands Office administers a 22-county Private Lands Coordination Area located in central Michigan. (See Figure 4.3) Within the Coordination Area, 349 wetland basins were restored through the Services's Partners for Fish and Wildlife Program for a total of 1,967 acres from 1994 through 1998. Native grassland nesting habitat was seeded on 12 sites for 355 acres from 1996 through 1998. The Private Lands Office provides technical assistance and cost-sharing to complete the work if the landowner agrees to maintain the area for a period of 10 years or more. The Partners for Fish and Wildlife program is a voluntary program that focuses on restoring and enhancing wetland and grassland habitats that provide wildlife, fisheries, water quality and recreation benefits. One Refuge staff person works exclusively on the Partners for Fish and Wildlife program.

Within the Private Lands Coordination Area, the refuge operations specialist (private lands) biologist provides technical assistance to the Michigan DNR, Farm Services Agency, Natural Resources Conservation Service, private conservation organizations, and private individuals on wetland issues, habitat conservation and enhancement, and regulatory requirements. The Refuge staff person works closely with the Natural Resources Conservation Service and Farm Service Agency on wetland actions and farm debt retirement programs and administration of the Wetland Reserve and Conservation Reserve Programs.

Farm Services Administration Conservation Easements

Shiawassee National Wildlife Refuge is responsible for managing conservation easements within the Shiawassee Fish and Wildlife Management District (FWMD), a 44-county area of Michigan (see Figure 4.3). The conservation easements were obtained through the procedures of the Farm Services Administration (FSA), formerly the Farmers Home Administration. When the FSA acquires property through a default of loans, it is required to protect wetland and floodplain resources on the property prior to resale to the public. The authority and direction for the FSA actions comes from the Consolidated Farm and Rural Development Act (7 U.S.C. 1981, 1985); Executive Order 11990 providing for the protection of wetlands; and Executive Order 11988 providing for the management of floodplain resources.

The U.S. Fish and Wildlife Service assists the FSA in identifying important wetland and floodplain resources on the property. Once those resources have been identified, FSA protects the areas through a perpetual conservation easement and assigns the management responsibility to the Service. The easement areas become part of the National Wildlife Refuge System.

The Shiawassee Fish and Wildlife Management District (FWMD) currently administers 113 conservation easements totaling 4,658.12 acres. Two of the 113 conservation easements have been transferred to County Soil Conservation Districts to be managed as outdoor education areas. The FWMD became responsible for its first easement in 1989 and others have continued to be added since then. Most of the easements were obtained in the early 1990s. The most recent additions were two easements added in fiscal year 1999. Shiawassee WMD has the most conservation easements of any Service station in the eight-state Great Lakes Region.

Figure 4.3: Shiawassee Fish and Wildlife Management District

Management of easements continues to be a problem with current staffing levels. Subdividing of easements due to land sales is increasing the number of landowners and management responsibilities (currently 113 easements are owned by 122 landowners). It appears this will continue to occur and continue to cause management concerns for the Shiawassee FWMD.

Planned Refuge Programs

Introduction

We recognize that we face challenges from outside the Refuge boundaries. These challenges include more frequent flooding with higher flows along with increased potential for contaminants. As interest and population grows in the Saginaw area, public use pressure may challenge the Refuge's wildlife purposes. And, because of the proximity to the urban population and its crime problems, the Refuge may experience some of the same illegal activities. We intend to work outside our boundaries to confront these challenges.

We also recognize the opportunities open to the Refuge. We have the ability to provide a remarkably large natural area for wildlife within an urban and agricultural landscape. We have the ability to provide wildlife-dependent recreation close to an urban and tourist population, and we have the ability to provide an environmental message of stewardship to these same populations.

We intend to take advantage of our opportunities. We will provide a diversity of habitat for wildlife while recognizing the importance of the Refuge to waterfowl. We will expand the lands that we manage by acquiring lands within the authorized boundary of the Refuge as funds and willing sellers permit. In addition, we will expand our interaction and services to the public. We will make the Refuge more accessible. We will expand and improve our educational opportunities and reach out to more people.

Photo by Myles Willard

Several circumstances are coming together now that encourage us to think that our intentions are realistic. First, we were authorized to expand our boundaries in 1996. Second, congressional interest in planning and the recognition of comprehensive conservation plans in the budgeting process give us encouragement that our plans will be implemented. Third, the General Motors settlement affords us new opportunities. Fourth, the Refuge and its mission are experiencing growing public support through the Friends group, local governments, and volunteers. This support is best exemplified by support for a Great Lakes Discovery Center at Bridgeport, where several groups are working together to build the center.

Briefly, these are our plans.

Fish and Wildlife

We intend to provide a large acreage of wetland habitat and unfragmented forest. We intend to diversify and enlarge natural habitats by eliminating mosquito control and by reducing cropland. We intend to monitor use of the habitat by fish and wildlife as a way of evaluating our management. We intend to work outside our boundaries as partners in restoring habitats on private lands and better managing our conservation easements.

Photo by Myles Willard

Basically, this is an adjustment of our efforts within our boundaries and an expansion of our efforts outside our boundaries.

Wildlife-dependent Recreation

We intend to continue past programs and make more of the Refuge available for wildlife observation through trails and an auto tour route. We intend to provide sites for bank fishing. We also intend to increase the feeling of security among our visitors through an increased law enforcement presence.

Environmental Education and Outreach

We intend to expand our environmental education and outreach programs. The General Motors settlement will permit an expanded environmental education program at Green Point Environmental Learning Center, and public support for the Great Lakes Discovery Center at Bridgeport will allow us to introduce the Refuge, the Service and its partners to more people.

We are excited about the potential for the next 15 years.

Refuge Habitats

Given the rate of natural succession and land use changes, we are not likely to see the completion of the Refuge in 15 years. All of the land within the authorized boundaries will probably not be in public ownership in 15 years, and all of the land will probably not be converted from its current use to the desired habitat. Nevertheless, to put our immediate actions in context, we have depicted our long-term vision for habitats on the Refuge in Figure 4.4 and Table 3.

The landscape depicted in Figure 4.4 represents our vision for when all land within the authorized boundaries is in public ownership and we have converted the lands to desired habitats. Our vision for habitats is based primarily on what habitats would occur naturally through succession and natural processes. Our vision of habitats is based on our knowledge of historical vegetation, soil moisture, current land use and land cover, and a desired future of habitats with less fragmentation.

As we acquire land and move toward our long-term vision of the landscape, we will likely move through stages in our management of habitats. For instance, some of the higher, drier areas that are envisioned to be grasslands in the long run may be farmed in the near-term to maintain them free of brush and noxious weeds until they can be converted and managed as grasslands.

The remainder of this section contains the primary strategies that more explicitly define the Refuge's management direction for the next 15 years (2001-2016). This direction is based on the Refuge System mission, the National Wildlife Refuge System Improvement Act of 1997, the purposes for which the Refuge was established, goals defined for the Great Lakes-Big Rivers Region, as well as agency policies and directives. Under the Migratory Bird Conservation Act, the Refuge's purpose is "...for use as an inviolate

Figure 4.4: Long-term Vision for Refuge Habitats

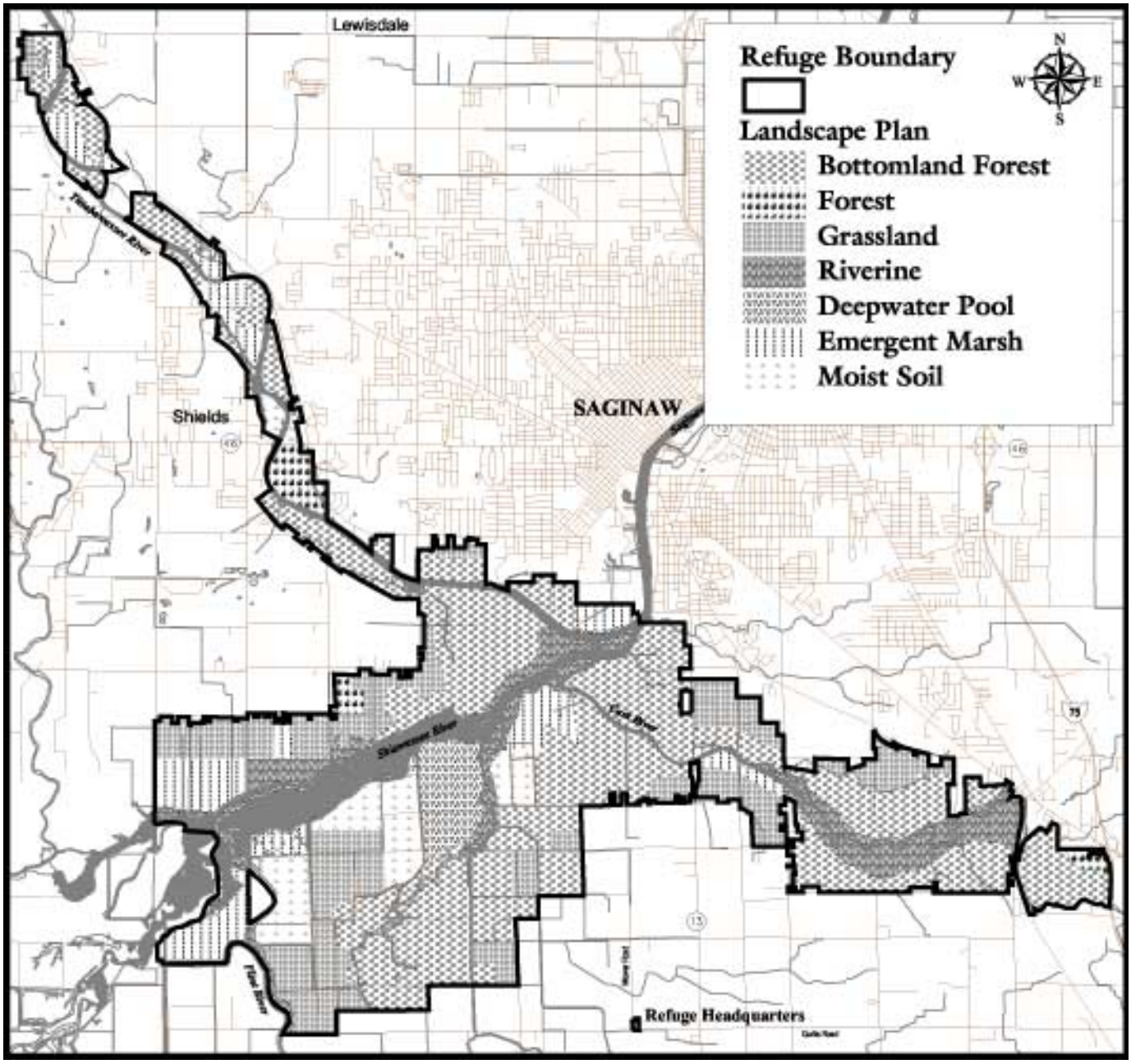


Table 3: Major Habitats – Current and Future

	Current	Future[1]	Long-term Vision
Moist Soil Units	385	1,042	1,115
Marshes	672	778	1,858
Open Water Pools	700	503	503
Greentree Reservoirs	820	820	820
Forests	3,519		337
Grasslands	580	1,358	3,045
Croplands	1,182		
Bottomland Forest		3,034	6,957
Riverine[2]		1,687	2,729
Total	**7,858**	**9,222**	**17,364**

[1] This table is intended to show the general trend and intent for habitats. Acres are not directly comparable across the table because the classification categories under 'current' differ from the other columns. 'Future' reflects the goals and objectives of the Comprehensive Conservation Plan. 'Long-term Vision' reflects the acres depicted in Figure 4.4,

[2] 'Riverine' includes river acres and marsh and bottomland forest acres associated with the river.

sanctuary, or for any other management purpose, for migratory birds." Under the Refuge Recreation Act, the Refuge's purpose is "suitable for: 1) incidental fish and wildlife-dependent recreational development; 2) the protection of natural resources, and 3) the conservation of endangered species or threatened species..."

Following the rationale of Schroeder, King, and Cornely (1998), we have chosen to base the Refuge's core management direction on habitat objectives. Schroeder et al. reason that many factors affect wildlife populations and many of these factors are outside the control of a refuge manager. However, a refuge manager can work to provide a high quality habitat, which is necessary for an abundant wildlife population. Schroeder, King, and Cornely argue that it is logical "to focus on the habitat conditions required to provide the greatest potential for the species or resource of concern."

The primary thrust of habitat management at the Refuge has been to provide diverse habitats to meet a variety of species requirements. We plan to continue to provide diverse habitats, which are defined more specifically in our habitat objectives. The potential benefits each species will receive from the habitats that we plan to provide are depicted in Appendix E. In interpreting the data in Appendix E, you should recognize that the contribution that a refuge habitat provides to a species is a function of the time of year the species is at the refuge and the number of acres of habitat available.

For Region 3 Resource Conservation Priorities (U.S. Fish and Wildlife Service, Region 3, 1999), Shiawassee wetlands provide migration and nesting habitat for species of recreational and economic value concern. Rare and declining species are also benefitted across all habitats.

Avoidance of Adverse Impacts to Listed Species

To assure that listed species will not be adversely affected, proposed species are not jeopardized, or critical habitat is not adversely modified, we will observe the following guidelines as we implement the Shiawassee CCP.

Photo by Kim LeBlanc

Bald Eagle (*Haliaeetus leucocephalus*)

No disturbance will take place during critical periods within protective zones as described in the 1983 Northern States Bald Eagle Recovery Plan, Appendix E, Management Guidelines for Breeding Areas.

Indiana Bat (*Myotis sodalis*)

No suitable trees will be removed between April 30 and October 1. Suitable trees include any species greater than 9 inches diameter at breast height. Exceptions include healthy plantation red pine (*Pinus resinosa*) (straight clean bole, no splits, cracks, breaks, dead limbs or other damage) or other suitable trees for which a competent wildlife biologist determines via exit survey that no bats (any species) are present.

Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*); Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)

Although not currently listed, the Eastern massasauga rattlesnake is a candidate for listing. Neither species is known on the Refuge, so no adverse effects are expected. As the CCP is implemented, the Refuge will seek opportunities for conservation of both species on and off the Refuge. We will use Johnson et al., 2000, The Eastern Massasauga Rattlesnake: A Handbook for Land Managers, USFWS, Ft. Snelling Minn., and USFWS, 1999, Eastern Prairie Fringed Orchid (*Platanthera leucophaea*) Recovery Plan. Ft. Snelling, Minn., to guide our conservation efforts.

Goals 6 and 7 of the plan deal with the private lands and conservation easement activities of the Refuge. These activities are on scattered tracts throughout much of Michigan's lower peninsula. We do not know of any listed species that occur on these tracts, but a number of federal listed species may occur and could potentially be affected by strategies under goals 6 and 7. To assure that listed species will not be adversely affected, or proposed species are not jeopardized, we will observe the following guidelines as we pursue goals 6 and 7. In addition to avoiding adverse effects, we will consider potentially beneficial habitat management or restoration projects for listed, proposed or candidate species through consultation with species experts.

Kirtland's Warbler (*Dendroica kirtlandi*)

No burning or tree removal activities will take place in jack pine (*Pinus banksiana*) stands less than 22 years old and greater than 40 acres in size unless current census data indicate the species is not present.

Piping Plover (*Charadrius melodus*)

No construction activities and no human activity that could disturb nesting or foraging piping plovers on occupied Great Lakes beach will take place between April 15 and August 15.

Piping Plover Critical Habitat

No disturbance will take place as described above for occupied units. No activities will occur that would remove any primary constituent element (66 FR 22938, May 7, 2001) on any designated unit.

Northern Copperbelly Watersnake (*Nerodia erythrogaster neglecta*)
This species is currently found in small scattered occurrences in Hillsdale, Cass and St. Joseph counties. It was recently found as far north as Eaton County and earlier in Oakland County. Potential adverse effects on the species are similar to Eastern massasauga. We will avoid actions that modify any buttonbush (*Cephalanthus occidentalis*) or scrub-shrub wetland, modify (burn, mow, brush hog, herbicide) or destroy any upland or wetland connections between such habitats, or drain, flood or otherwise modify hydrology permanently or seasonally in southern Michigan. We will avoid adverse effects by careful site surveys in southern Michigan counties and early coordination with species experts. We will consider habitat restoration and site protection for the benefit of the species in consultation with species experts.

Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*)
In occupied sites, we will avoid actions that favor vegetational succession from open to closed canopy, modify any wetland, modify (burn, mow, brush hog) or destroy any upland or wetland connections between wetlands (habitat fragmentation), or drain, flood or otherwise modify hydrology permanently or seasonally in southern Michigan. We will use the threats section, pages 16-30, of The Eastern Massasauga Rattlesnake: A Handbook for Land Managers (Johnson et al. 2000) as our guide to avoid actions that contribute to identified threats.

Mitchell's Satyr Butterfly (*Neonympha mitchelli mitchelli*)
We will undertake no activities that affect hydrology or vegetation in fen or former fen habitats in the southern three tiers of Michigan's counties without a careful pre-action site survey and planning. Activities that could adversely affect the species include wetland restorations, vegetation mowing and/or burning or herbicide application in occupied sites. These same activities may also benefit the species if properly planned. Before considering any action, we will review the Recovery Plan and coordinate with species experts.

Karner Blue Butterfly (*Lycaeides melissa samuelis*)
We will not initiate burning, mowing, disking, herbicide application or other vegetation or soil disturbance on sites occupied by this species or sites with wild blue lupine. We recognize that oak-savannah or other prairie restoration activities are valuable to this species. We will consider these activities subject to Service guidelines and further Section 7 consultation, including formal consultation on occupied sites.

American Burying Beetle (*Nicrophorus americanus*)
This species has not been seen in Michigan for years, and we assume that it is not present. But, as with all species, we will seek to stay current on species occurrence.

Clubshell Mussel (*Pleurobema clava*)
The clubshell mussel is currently found only in Hillsdale County. Habitat restoration activities that improve stream water quality in Hillsdale and other southern Michigan counties should benefit the species. We will avoid any activities that directly affect stream beds or introduce siltation to streams.

Northern Riffleshell Mussel (*Epioblasma rangiana*)
This species may be extirpated from recent occurrence in Detroit River. There are recent (1999-2000) indications of remnant populations in the Black River drainage of Sanilac and St. Clair counties. As with the clubshell, we will avoid activities that disrupt stream beds or introduce siltation. Actions that directly or indirectly improve stream water quality should benefit the species.

Pitcher's Thistle (*Cirsium pitcheri*)
This species is found only within active Great Lakes shoreline dune systems. We will avoid any activities, such as dune stabilization projects or earth moving activity, that directly disturb occupied sites or that would disrupt natural sand dune disturbance processes.

Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)
We will avoid mowing, brushing, burning, flooding or herbicide use in occupied or potential sites. This species, which is found in remnant lake plain prairies, has a high potential to be adversely affected directly by habitat restoration activities that alter vegetation and hydrology. The same activities, however, may benefit the species when properly planned and timed. A beneficial project that may result in an adverse effect (short-term harm) can proceed after careful site surveys, planning, early coordination with species experts and a project specific Section 7 consultation.

Small Whorled Pogonia (*Isotria medeoloides*)
There is only one Michigan record (Berrien County on private land) for this species. Due to its rare and local distribution in Michigan, CCP actions are not likely to affect this species. Because any action that disturbs or alters vegetation could affect the species, we will avoid adverse effects for projects in Berrien County by seeking current information prior to implementation.

The above discussion of avoiding adverse effects and CCP goals applies to project sites where listed, proposed or candidate species are known to occur or where it is necessary to assume they are present. On these sites, CCP actions that adhere to the above restrictions should have no effect on the listed species. Where CCP actions that may not comply with the adverse effects restrictions on occupied sites (i.e., restoration on an occupied Karner blue butterfly site) are desired, site or project specific Endangered Species Act (ESA) Section 7 consultation will be required. On sites where surveys or other current information provides certainty that ESA species are not present, actions that are determined to have no effect on listed species may proceed without additional Section 7 contact with the Ecological Services field office. Projects on unoccupied sites that are determined to benefit listed species, that is, not likely to adversely affect species, should receive field office concurrence. Early coordination with the field office is advisable where any uncertainty exists.

Climate Change Impacts
The U.S. Department of the Interior issued an order in January 2001 requiring federal agencies under its direction that have land management responsibilities to consider potential climate change impacts as part of long range planning endeavors.

The increase of carbon within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for national wildlife refuges, carbon sequestration constitutes the primary climate-related impact to be considered in planning. The U.S. Department of Energy's "*Carbon Sequestration Research and Development*" (U.S. DOE, 1999) defines carbon sequestration as "...the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

The land is a tremendous force in carbon sequestration. Terrestrial biomes of all sorts – grasslands, forests, wetlands, tundra, perpetual ice and desert – are effective both in

preventing carbon emission and acting as a biological "scrubber" of atmospheric carbon monoxide. The Department of Energy report's conclusions noted that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere.

Preserving natural habitat for wildlife is the heart of any long range plan for national wildlife refuges. The actions proposed in this comprehensive conservation plan would preserve or restore land and water, and would thus enhance carbon sequestration. This in turn contributes positively to efforts to mitigate human-induced global climate changes.

Primary Facilities

Two primary facilities on the Refuge will serve the public. The Green Point Environmental Learning Center will focus on environmental education and its audience will be school children. The planned Great Lakes Discovery Center will introduce and orient the general public to the Refuge. The Green Point facility is well located to serve the urban schools of Saginaw. The Great Lakes Discovery Center will be accessible to a large public audience on Interstate 75. The purposes of the facilities will not be exclusive, however. We will welcome the public and encourage their trail use at Green Point and some structured environmental education activities will take place at the Great Lakes Discovery Center. Visitor services at the primary facilities will be complemented by a restored environmental education site within the Refuge and through information available at the Refuge office.

Green Point Environmental Learning Center will remain the focal point for all Refuge environmental education activities. Green Point has the advantage of being easily accessible to the urban Saginaw schools. Because some educational activities are best done nearer the Refuge core, we intend to reestablish an environmental education site that was destroyed by flood waters over 10 years ago. This site will support field environmental education by providing restrooms, shelter, and tables. School children, youth groups, and educators will continue to be the primary audiences at Green Point, but drop-in visitors will be welcome too.

Photo by Myles Willard

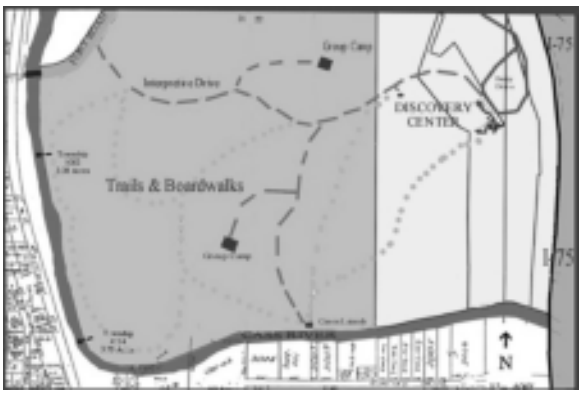
The Great Lakes Discovery Center will emerge from a unique public/private partnership among the Service, other natural resource agencies, and a variety of non-governmental organizations. The Vision of the Great Lakes Discovery Center is to inspire a sense of appreciation and stewardship in the people who interact with the Great Lakes Basin and its natural resources, utilizing the latest technology in a state-of-the-art facility. The partners propose to achieve the Vision through an educational facility that blends multimedia technology with a variety of "natural" experiences. The Center and its programs will be designed to make visitors, area residents, school children, and "passers-by" more aware of the impact humans have upon the Great Lakes Basin.

The Friends of the Shiawassee National Wildlife Refuge, a private non-profit organization, has assembled a team of organizations and public agencies that include, but are not limited to:

Michigan United Conservation Clubs
Trout Unlimited
Saginaw County Convention and Visitors Bureau
Spicer Engineering
Andersen Foundation
The Conservation Fund
The Nature Conservancy
Michigan Sea Grant
Swan Valley School District
Saginaw Valley Watershed Initiative Network
Michigan Department of Natural Resources
Great Lakes Fishery Commission
National Conservation Training Center
Saginaw Basin Land Conservancy;
National Park Service
U.S. Forest Service
Bridgeport Charter Township
Saginaw Valley Audubon Society
Ducks Unlimited, Inc.
Pheasants Forever
Saginaw County Planning Department
Mattison Company
U.S. Geological Survey
Partnership for the Saginaw Bay Watershed
United Auto Workers
Saginaw County Historical Society
Natural Resources Conservation Service
Saginaw Chippewa Indian Tribe
RC Associates, Inc.
Saginaw Bay Advisory Council
Ruffed Grouse Society;
U.S. Fish and Wildlife Service
Bay City
Birch Run and Bridgeport Chambers of Commerce

Many of these organizations and agencies will be responsible for creating and delivering environmental displays and learning opportunities at the Discovery Center. They will also use the resources of the Discovery Center as a platform to conduct training and research into environmental issues that impact the Great Lakes Basin.

The Service will possess the "platform" around which the environmental groups will build the specific details and programming. In 1999 the Service purchased 116 acres in Bridgeport Township known as the Warner Tract. This will be the site for the Center. The site lies along the Cass River adjacent to Interstate 75. Bridgeport Charter Township has provided an additional adjoining 300 acres through a 99-year lease.



Rendering and site plan courtesy of The Mattison Company

The 416-acre site contains a unique upland American beech/white pine forest, bottomland hardwoods, buttonbush marshes, and grasslands that provide habitat for numerous species of wildlife including bald eagles, warblers, beaver, river otter, and white-tailed deer. This unique site borders restaurants, hotels, and service stations.

The Great Lakes Discovery Center site is located within a few miles of Birch Run and Frankenmuth, two of the most visited tourist and shopping destination sites in Michigan. Saginaw, Bay City, Flint and Midland are all within 45 minutes of the Center site. Interstate 75, Michigan's major travel corridor between Detroit and northern Michigan, will provide an opportunity for millions of travelers to visit the Center.

A visitor entering the Great Lakes Discovery Center will have the opportunity to explore the diversity and inter-connectedness of the various natural systems that compose the Great Lakes Basin. Multimedia technology will transport visitors to remote locations throughout the Great Lakes to visually experience the variety and beauty of the ecosystem. The Center will also provide opportunities for "hands-on" experiences within the facility and on the surrounding lands and streams. Students and teachers from universities throughout the Basin will be able to use the Center for learning and teaching. Visitors to the Center will want to return again and again, in different seasons and to changing exhibits.

Planned features in the Discovery Center include:

- A 200-seat auditorium with a range of multimedia capabilities to transport visitors from their seat to remote locations across the region.
- A rotunda to house state-of-the-art exhibits.
- A museum to display "sensitive" materials and exhibits.
- A "natural" stream flowing through the Center to demonstrate the wetland filter process to all visitors.
- An observation tower with a 360-degree view of the area, including a variety of video monitors that allow the visitor to "virtually" view environmentally sensitive or interesting areas at off-site locations throughout the Great Lakes via WebCams.
- A laboratory capable of accommodating up to 25 students conducting research.
- A 200-seat meeting hall that will have the capabilities of being divided into four smaller rooms with kitchen facilities.
- Office space and support facilities for the staff and visitors.

Plans for the 416-acre Discovery Center site include:

- Accessible nature trails that may be used by walkers, cyclists, and cross-country skiers. The trails will include boardwalks, observation decks with spotting scopes, information kiosks, and interpretive signs.
- A restored native prairie grassland demonstration.
- A restored wetland demonstration.
- A bank fishing site on the Cass River.
- A casting pond where visitors can learn the art of fly fishing.
- The terminus of a canoe trail that begins off-site.
- An outdoor amphitheater for environmental education.
- A group campsite for youth groups visiting the Center.

The details and content of the exhibits will be the responsibility of the various participating groups. Each exhibit will provide an in-depth experience into the environmental diversity of the Great Lakes Basin. A project manager will coordinate the exhibit design and programming. The exhibits will be changed on a regular basis to provide a continued attraction to visitors.

The Friends of the Shiawassee National Wildlife Refuge and their partners have created an exciting vision for a facility that will benefit the residents of Michigan, visitors to the Great Lakes Basin, outdoor enthusiasts, schools, and universities. The Service and Bridgeport Charter Township have provided the platform for the vision, and the site is a part of the Shiawassee National Wildlife Refuge. The Center will be a U.S. Fish and Wildlife Service facility operated jointly by the Service and the partners. Funding for staff, operation, and maintenance will be determined by the Service and the partners when the facility has been planned in detail and construction is imminent.

The partners estimate that a $9 million capital investment is required to bring their vision to fruition. The investment will build the buildings, acquire the technology that will allow visitors to experience the breadth and depth of the ecosystem, and construct the on-site improvements that will provide the experiential benefits.

Our intent is to maintain the Refuge office and maintenance facility in their current location, because of the central location. This approach – environmental education at Green Point, Great Lakes Discovery Center at Bridgeport, and office and maintenance in their present location – takes advantage of existing facilities and makes the most of the opportunity to employ the Bridgeport site to bring an environmental message to a new audience.

Land Exchange

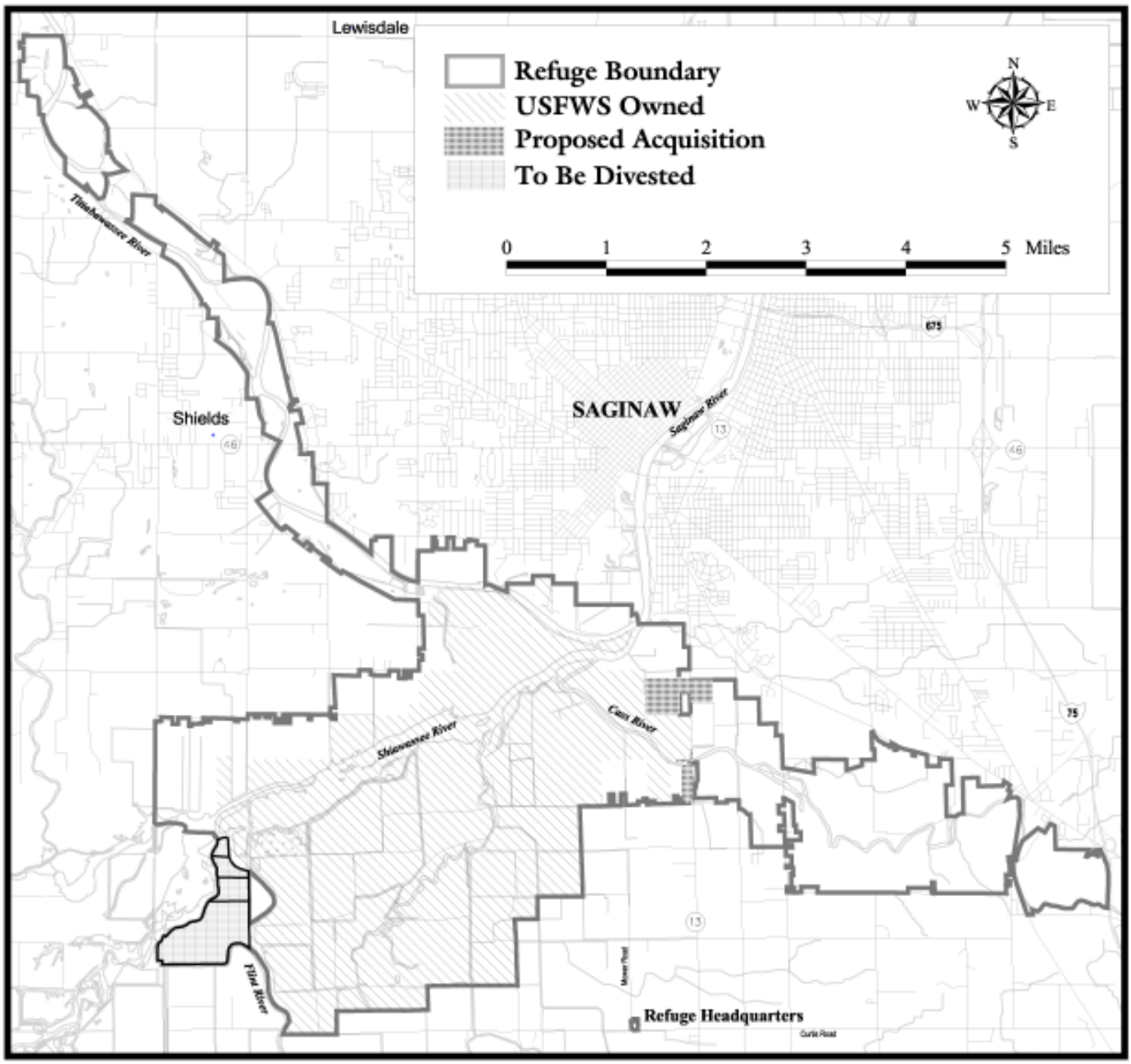
We have sought to exchange certain lands with the State of Michigan for several years. We intend to continue to pursue the land exchange to better our management and acquire additional habitat for wildlife. We would like to transfer the area in and around Pool 4 to the State of Michigan. In exchange we would like to acquire land of equivalent value on the east side of the Refuge near Highway 13. Figure 4.5 depicts the lands involved in the exchange.

Photo by Myles Willard

More than 10 years ago the bridge across Miller Drain became unsafe and was removed. Since that time, farming in the unit known as Pool 4 has ended and it has been difficult for Refuge staff to visit and adequately manage Pool 4. To fulfill the need of management, the Michigan Department of Natural Resources has managed the hunting and wildlife in the area under a cooperative agreement. In use and management, Pool 4 is more closely associated with the Shiawassee River State Game Area, which is managed by the Michigan Department of Natural Resources.

Michigan owns land within the authorized expansion area of the Refuge. Because these lands are adjacent to existing Refuge lands and are isolated from other state lands, we believe it makes sense to manage them as part of the Refuge. Therefore, we intend to pursue the exchange, which will result in an adjustment of the Refuge boundary. Wildlife benefits are not expected to decrease and management efficiency is expected to increase as part of the exchange.

Figure 4.5 Land Exchange Proposal



Goals and Objectives

The goals that follow are general statements of what we want to accomplish in the next 15 years.

The objectives are specific statements of what will be accomplished to help achieve a goal. Objectives describe the who, what, when, where, and why of what is to be accomplished. Strategies listed under each objective specify the activities that will be pursued to realize an objective. The strategies may be refined or amended as specific tasks are completed or new research and information come to light.

In the numbering scheme that follows, the first number represents the number of the goal. The second number represents an objective within that goal. The third number represents a strategy within an objective. Thus, 3.2.1 represents the first strategy for the second objective within the third goal. This numbering scheme is used to index Refuge Operating Needs System (RONS) Projects in Appendix C and personnel needs in Chapter 5.

Goal 1: Habitat Management

Restore and/or maintain marshes, moist soil units, grasslands and floodplain forests for an optimum blend of breeding and migration habitat for a diversity of migratory birds. See Figure 4.4 and Table 2 for the ultimate habitat targets for the Refuge.

Floodplain Forest

1.1 Objective: Provide nine blocks totaling 1,150 acres of unfragmented bottomland hardwood forest made up of mast producing trees such as oak and hickory mixed with other species such as maple, ironwood, box elder, green ash, elm, and willow. The blocks should be linked by corridors whenever possible. The forest should also have a component of large nest and cavity producing trees such as cottonwood.

Each block should be at least 100 acres in size for forest interior bird species. This is considered the minimum block size needed for most forest interior bird species to successfully nest and will provide habitat for more than 50 other bird species that use woodlands as part of their habitat requirements (i.e. woodpeckers and orioles).

Strategy:
1.1.1 Reforest large unfragmented forest blocks. (RONS 00019)

1.2 Objective: Within 6 years selectively cut 350 acres of bottomland hardwood forest to promote multilayer forest to enhance the diversity of habitat and wildlife. The selective cuts will be carried out in a fashion to favor large mast producing or large nest and cavity trees, by thinning the wood surrounding the selected trees. The intent is to develop a two-tier forest with an overstory favoring the trees described above and an understory of mixed younger trees comprised of all the typical species found in bottomland forests in this area. (Minnesota Department of Natural Resources, 1998)

Strategies:

1.2.1 Within 1 year, write a forest management plan through contracting. (RONS 00020)

1.2.2 Selectively cut trees within 5 years after forest management plan is completed. (RONS 00020)

1.3 Objective: In 3 out of 5 years, shallowly flood (from 3 to 12 inches) the greentree reservoirs (pools 3 and 5) to provide 200-400 acres of food and loafing areas for migrating waterfowl and wading birds during the months of March and April and again from October through November.

Strategies:

1.3.1 Repair/rehabilitate the dikes around pools 3 and 5. (RONS No. 00001)

1.3.2 Install a pumping station to move water into and out of pools 3 and 5. (RONS No. 00002)

1.3a Objective: Manage newly acquired floodplain forest lands in a natural state, allowing seasonal floodwaters to inundate these areas in a natural cycle. The intent is to restore the natural ecological function of the river corridor, increase the river floodplain, and improve spawning potential for fish such as northern pike and yellow perch.

Strategy:

1.3a.1 As newly acquired floodplain forest becomes manageable, move any river dikes back from the banks to the exterior boundary of the unit.

Deep Water Pools

1.4 Objective: In 4 out of 5 years, of the 700 potential acres, flood at least 200 acres of deepwater pools at least 2 feet deep from February through March and October through November to provide a feeding and loafing area for diving ducks. Expected submergent plants in the pools include various species of pondweed.

Strategies:

1.4.1 Manage water levels in Units 1a, Grefe, 2, and 4 to provide the needed acreage. The details of what pools are to be flooded each year will be specified in the Refuge's water management plan. (RONS No. 97017)

1.4.2 Where possible, manage water levels to provide access of spring spawning fish to deep water pools.

Moist Soil Units

1.5 Objective: Provide a minimum of 200 acres of prime moist soil habitat ranging from mudflats to 8-inch depth, March through May and October through November, primarily for migrating shorebirds, waterfowl, and wading birds. Through the first half of spring, the habitat will be shallowly flooded up to 8 inches in depth to provide food for early

migrating waterfowl. Through the last half of spring, 25 percent of the moist soil habitat will be in mudflats to provide food for migrating waterfowl such as shoveler and teal and shorebirds. Spring vegetation is expected to provide structure and habitat for invertebrates used by waterfowl and shorebirds. In fall, 70 percent of the moist soil habitat will be seed producing plants for migrating waterfowl. The fall vegetation is expected to be comprised of plants such as wild millets, smartweeds, sedges, and bidens species.

Strategies:

1.5.1 Maintain dikes through a variety of techniques such as placement of filter fabric and rip rap on slopes exposed directly to current or wave erosion, mowing the dikes to maintain needed vegetation to stabilize the dikes, controlling woody vegetation, and repairing and maintaining water control structures. (RONS Nos. 97023, 98004, 98005 and 97017)

1.5.2 Subdivide Moist Soil Unit 1 into two units to optimize water management capabilities. (RONS No. 00017 and 97017)

1.5.3 Follow annual water management plan.

1.5.4 Hire a permanent seasonal tractor operator. (RONS No. 00015)

Emergent Marshes (Pools 2 and 4)

1.6 Objective: In 3 out of 5 years provide hemi-marsh of 50 to 70 percent emergent vegetation during the growing season in pools 2 and 4 for waterfowl, wading birds, and shore birds. The water depth in the marsh will range from 3 to 36 inches. The marsh will include open water interspersed with dense emergent vegetation such as cattail and bulrush. This will provide a blend of three different habitat structures:

Photo by Myles Willard

1. Open deep water pool with scattered emergent vegetation;
2. A medium deep (12 to 18 inches) hemi marsh of cattail and bulrush; and
3. A shallow water (1 to 8 inches) hemi marsh condition with some moist soil plants mixed with emergent vegetation.

Strategies:

1.6.1 Follow annual water management plan.

1.6.2 When possible, operate water levels to ensure access to marshes by spring spawning fish such as northern pike. (RONS 97017)

Grasslands

Photo by Kim LeBlanc

1.7 Objective: Provide 400 acres of grassland habitat that are a mix of cool and warm season grasses interspersed with broad-leaf forbs. We will favor native species of grasses and forbs. This habitat will provide nesting during the summer for ducks and nesting and foraging sites for species such as the bobolink, sedge wren, meadow lark, and savannah sparrow. These acres will also provide non-breeding habitat for short-eared owl, northern harrier and rough-legged hawks.

Strategies:

1.7.1 Add one permanent seasonal Tractor Operator to Refuge staff. (RONS No. 00015)

1.7.2 Burning, spraying, and mechanical manipulation of grassland to control invasive species when less than 85 percent of the total acreage of a unit is dominated by desired grassland structure. (RONS No. 97023)

1.7.3 Cool season grasses reseeded to restore vigor after 5 to 8 years. (RONS No. 97023)

1.7.4 Purchase a no-till grass drill to restore Refuge grasslands. (RONS No. 00016)

Croplands

1.8 Objective: Over the life of this plan, reduce cropland acres while providing for waterfowl, wildlife depredation ,and wildlife-dependent public uses.

Rationale: The current, dominant opinion among wildlife biologists is that natural foods should be favored over agricultural crops in wildlife management. They maintain that natural foods provide more food value for a wider variety of species than high carbohydrate foods such as corn and soybeans. Biologists point to the well documented species diversity of birds in wetlands and grasslands compared to monotypic agricultural fields as evidence of their point.

Although we forego some *wildlife diversity* with crops at Shiawassee National Wildlife Refuge, we do gain four wildlife and management benefits with crops. First, crops provide high carbohydrate food for migrating waterfowl. Although the crops are probably not essential to migrating waterfowl in the Saginaw area, the crops do supplement the other foods available. Second, refuge crops lure waterfowl and reduce depredation of crops on neighboring agricultural lands. Over the life of this plan and beyond, we expect that neighboring land uses will change from dominant agriculture to developed lands and that the value of reducing depredation will be decreased. Third, crops attract wildlife for hunting and wildlife viewing, which increases the quality of these wildlife-dependent public uses. If the timing and water depths are right, shorebirds find shallowly flooded row crops to be very attractive as feeding locations. Typically there are good

populations of polychaetes and other invertebrates in the fields. For example, the observation deck at the Curtis Road parking lot overlooks a "wet spot" in a Refuge agricultural field that attracts many shorebirds – especially plover species. Over the life of this plan, we expect to develop through education and interpretation an increased appreciation among visitors for natural environments and their benefits. And, fourth, under the conditions that crops are managed at Shiawassee, the crops increase the species diversity and abundance of birds besides waterfowl. Because the cropland at Shiawassee incorporates grass filter strips and exists in a complex made up of nearby wetlands and forests, cropland benefits killdeer, horned lark, snow bunting, lapland longspur, short-eared and snowy owl, barn swallow, savannah sparrow, vesper sparrow and downy woodpecker.

Cropping can be used on a case-by-case basis for specific management purposes, as well. Moist soil unit management, for example, typically includes a rotation of row-cropped agricultural plants to control weeds and woody vegetation.

When we acquire new lands, sellers will be offered a 2-year option to continue to farm the land. After the 2-year option expires, cooperative farmers will be encouraged to move from the wet, core area of the Refuge to acquired lands if the acquired lands meet the following conditions: the land is presently in crops; the cropland is more than 1,000 feet from any river channel; and the cropland does not flood more than once a year. At no time will cropland acreage on the Refuge exceed 1,182 acres except for a short term while lands are being acquired. This acreage will continually decrease until we reach our objective.

We will consider the retention of small food plots to enhance wildlife viewing as we write a step-down plan for public use. The location and size of possible food plots will be specified in the step-down plan.

Long-term, we will seek to increase wildlife diversity by reducing cropland and moving to a more natural complex as depicted in Figure 4.4 (page 44). The rate of cropland reduction will depend, primarily, on changes in land use of neighboring lands. In the near-term, we will eliminate farming from the wettest area of the Farm Unit 1 (see Objective 1.9).

Strategy:

1.8.1 Use low input, sustainable yield and integrated pest management farming practices. (RONS 00021)

1.9 Objective: Convert 200 acres of the existing Farm Unit 1 into a wetland complex that includes emergent marsh, a moist soil unit, and grasslands, when alternative farming acreage has been acquired and identified.

Strategy:

1.9.1 Construct low-level dikes to convert farmed wetland into wetland habitat. (RONS 00022)

Riverine

We are concerned about how our marsh management affects reproduction and recruitment of juvenile fish to the river system and bay. We are also concerned about the effects of sediment loads on all of the Refuge bottomland hardwoods.

1.10 Objective: To determine the effects of Refuge activities on the riverine environment and, if necessary, mitigate adverse effects.

Strategy:

1.10.1 Develop partnerships with Biological Resources Division and Water Resources Division of the USGS, universities, USFWS Alpena Fishery Resources Office and EPA to study these issues and make management recommendations.

1.11 Objective: To monitor and evaluate a diversity of Refuge habitats. (This objective applies to all habitats under Goal 1.)

Strategy:

1.11.1 Hire a full-time biological technician to monitor habitat. (RONS No. 99005)

Goal 2: Fish and Wildlife Population Management

To manage fish and wildlife populations and to monitor and study the status and response of selected species to habitat management as specified in an inventory and monitoring plan.

2.1 Objective: To estimate use of the Refuge by selected bird species during the migration and breeding seasons.

Strategies:

2.1.1 Revise and implement the Wildlife Inventory Plan by 2002.

2.1.2 Monitor selected species of wetland, grassland, and forest interior birds.

2.1.3 Continue to monitor waterfowl.

2.1.4 Continue the Monitoring Avian Productivity and Survivorship (MAPS) activities primarily through Refuge volunteers.

2.2 Objective: To monitor diversity and population trends in amphibians and deer.

Strategies:

2.2.1 Continue annual spring breeding frog and toad survey.

2.2.2 Continue to assess deer sex ratio and aerial winter count.

2.3 Objective: To monitor diversity and population trends of fish and mussel species and abundance of juvenile fish in rivers and wetlands.

Strategies:

2.3.1 Study Refuge impact on juvenile lake sturgeon populations. (RONS No. 00013)

2.3.2 Write grant requests to support fish and mussel monitoring work. (RONS No. 00013)

2.3.3 Write grant requests to analyze fish abundance of juvenile fish populations in managed, breached, and natural wetlands. (RONS No. 00013)

2.3.4 Develop fisheries management plan in cooperation with the Alpena Fishery Resources Office.

2.4 Objective: To monitor presence and location of invasive fish and mussel species every 5 years.

Strategies:

2.4.1 Continue partnership with Alpena Fishery Resources Office, Michigan Sea Grant, MUCC and other state and local conservation groups.

2.4.2 Continue monitoring and survey work.

2.5 Objective: To fulfill partnership responsibilities for monitoring wildlife populations regionally and nationally. (See fish and wildlife monitoring section earlier in this chapter.)

Strategies:

2.5.1 Recruit volunteers in support of effort.

2.5.2 Add one full-time Biological Technician to staff. (RONS No. 99005)

Photo by Kim LeBlanc

2.6 Objective: To determine the effect of deer browsing on forest composition and regeneration.

Strategy:

2.6.1 Conduct a deer browse survey every 2 years over a period of 14 years. Details of the survey will be specified in the forest management plan.

2.7 Objective: To maintain the deer population at a maximum of 30 deer per square mile.

Strategy:

2.7.1 Continue current hunting program including nonambulatory, shotgun, muzzleloader, and archery hunts.

2.8 Objective: To meet agreement obligations and fulfill partnership responsibilities with the State of Michigan in controlling resident goose populations.

Strategy:

2.8.1 Carry out the activities of the hunt plan, which details the operation of the goose hunt.

2.9 Objective: To control nuisance wildlife species within the guidelines of the Integrated Pest Management Plan.

Strategy:

2.9.1 Review and revise Integrated Pest Management Plan by 2001.

Goal 3: Public Use

To encourage an appreciation of Shiawassee National Wildlife Refuge, its fish and wildlife resources, and its management activities through quality recreational and educational programs. Public Use facilities are shown in Figure 4.6.

The Refuge will facilitate hunting, fishing, wildlife observation and photography, environmental education and interpretation as wildlife-dependent recreational uses. The following objectives better specify how these uses will be facilitated.

Hunting

3.1 Objective: Continue hunting program at current levels of opportunity.

Strategy:

3.1.1 Maintain coordination and cooperation with Michigan Department of Natural Resources and private groups.

Fishing

3.2 Objective: Provide four stream bank fishing sites plus one boat landing in designated areas within the Refuge.

Strategies:

3.2.1 Develop sites at areas along the Cass River off of Highway M-13, along the Tittabawassee River off of the Woodland Trail, along the Tittabawassee River off the trails at Green Point Environmental Learning Center, and along the Spaulding Drain. The Cass River site will include an accessible fishing dock/platform. Site development will require rip-rap reinforcement and steps. (RONS No. 00010)

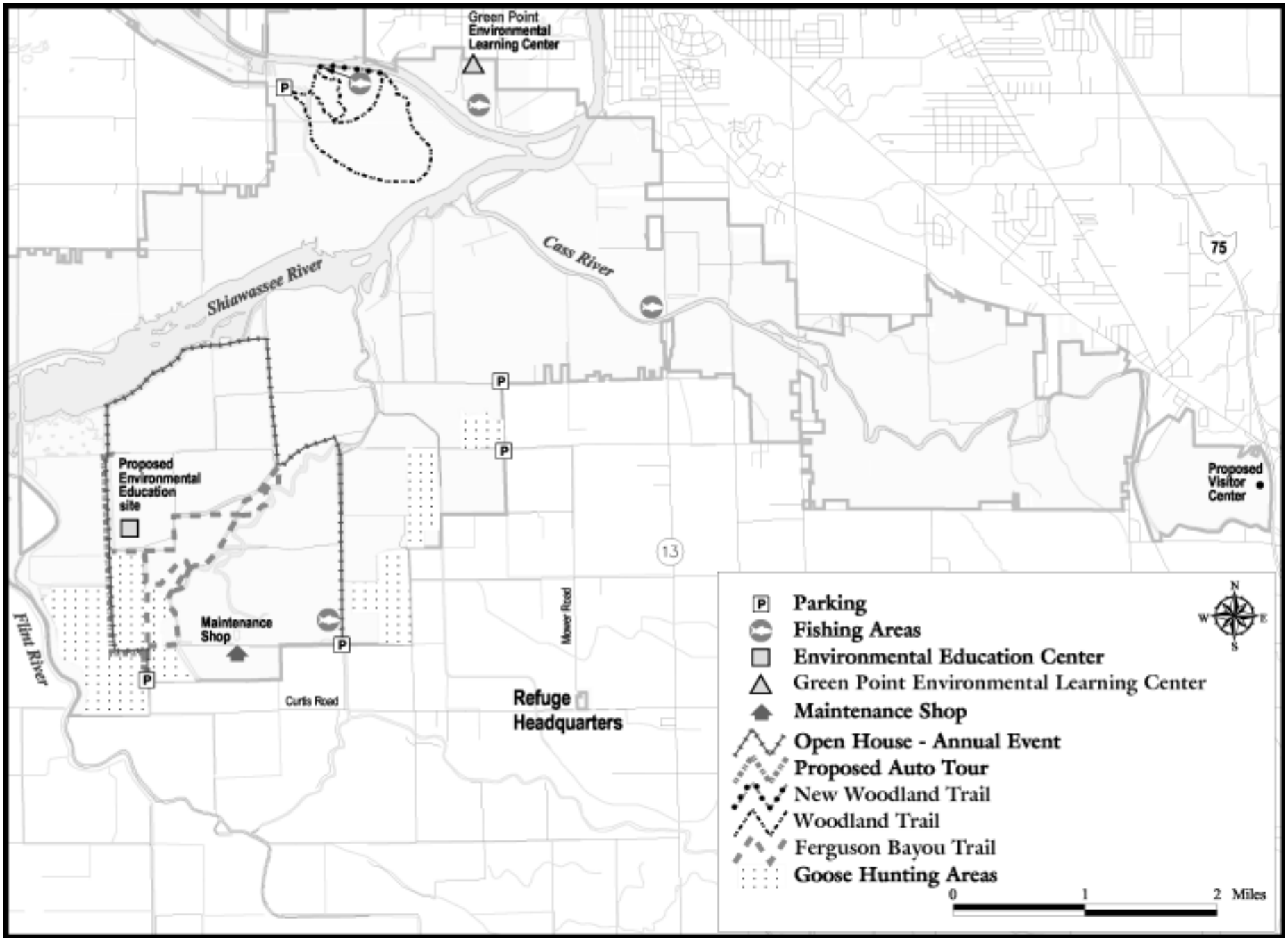
3.2.2 Amend the Refuge Sport Fishing Plan and Federal Register Refuge Specific regulations to allow bank fishing on the Refuge.

3.2.3 Work in partnership with Thomas Township to acquire land for boat access to the Tittabawassee River and construction of an accessible boat landing and parking lot. (RONS No. 00018)

Wildlife Observation and Photography

3.3 Objective: Provide at least 10 miles of hiking, bicycling, and cross country skiing trails, open year-round except during short periods in the fall, and at

Figure 4.6 Public Use Facilities



least 1 mile of auto tour trail open 6 months of the year (April to September) for the purpose of observing, studying, and photographing wildlife.

Strategies:

3.3.1 Establish a two-way auto tour route from the Curtis Road parking lot to the beginning of the high dike. Design and install gates, parking lot, observation area, and interpretive/guide signs. (RONS No. 97018)

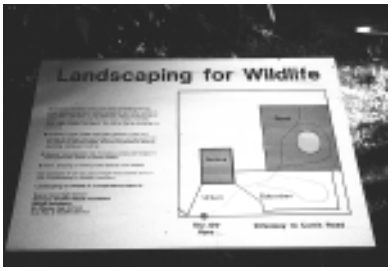


Photo by Steve Lewis

3.3.2 Expand and enhance Refuge trail system by incorporating interpretive and guide signs, benches, and upgrading the trail surfaces to meet U.S. Fish and Wildlife Service standards. Design and develop new trails along the Tittabawassee River at the Woodland Trail (Stroebel Road) and along the Cass River (off of M-13). Provide accessible toilet facilities along the trails. (RONS No. 00007)

Environmental Education

3.4 Objective: Present on-site environmental education program to 5,000 people per year by 2004, with a 2 percent annual growth rate, through contacts with community organizations, churches, and schools.

Strategies:

3.4.1 Work with partners to pay for bus transportation.

3.4.2 Increase promotion of environmental education programs through personal visits, mailings, and telephone. (RONS No. 000014)

3.4.3 By the year 2004, enhance and upgrade facilities at the Green Point Environmental Learning Center using General Motors settlement money and partnerships. (RONS No. 97003)

3.4.4 Add two permanent park rangers to the Refuge staff to work at Green Point Environmental Learning Center to develop outreach programs for schools and the general public, as well as to develop interpretive displays, signs, and brochures. (RONS No. 97003)

3.4.5 Develop an internship program that will augment the staffing by one full-time equivalent during the year. (RONS 00023)

3.4.6 Develop a facility that can house interns, volunteers, or Student Conservation Association workers by the spring of the year 2000 and submit a RONS project for additional expanded housing by 2002.

3.4.7 Reestablish an environmental education site at the Refuge to include picnic tables, toilets, a shelter, and space for bus parking by the year 2003. (RONS No. 00008)

3.5 Objective: Present off-site environmental education programs to 3,000 people per year by 2004, with a 2 percent annual increase.

Strategies:

3.5.1 Acquire a vehicle for environmental education staff. (RONS No. 00004)

3.5.2 Increase promotion of environmental education program through personal visits, mailings, and telephone. (RONS No. 00014)

3.6 Objective: Establish 500 environmental education contacts per year with educators, including attendance at on-site activities, using Refuge materials and services, and having their students attend a program presented by the Refuge.

Photo by Myles Willard

Strategies:

3.6.1 Increase promotion of environmental education program through personal visits, mailings, and telephone. (RONS No. 00014)

3.6.2 Offer an environmental education day for educators.

3.6.3 Establish partnerships with support groups to assist with environmental education.

3.6.4 Expand services to become an environmental education resource center that would include environmental education references, sample curriculum, and video tapes, for example. (RONS No. 98006)

Interpretation

3.7 Objective: The level of knowledge about and the positive attitude toward the Refuge will increase among visitors throughout the next 15 years.

Strategies:

3.7.1 By 2001, develop interpretive themes for the Refuge that communicate the activities of the staff and the ecological importance of the Refuge.

3.7.2 Incorporate the interpretive themes of the Refuge in all interpretive media, including brochures, signs, and programs (ongoing). Complete an interpretive trail at Curtis Road by 2002.

3.7.3 Expand interpretive programs to a new audience by offering guided interpretive trips to horseback riders in a manner that will not conflict with other users.

3.7.4 By 2001, determine the baseline of knowledge and attitudes among visitors.

Goal 4: Outreach

To improve public stewardship of Shiawassee National Wildlife Refuge and natural resources by increasing the public's understanding, positive attitude, and involvement.

4.1 Objective: Make an additional 200,000 people each year aware of the Refuge's fish, wildlife, and public use resources and its role in the Great Lakes Ecosystem using a consistent theme throughout the Refuge's facilities.

Strategies:

4.1.1 Work with Great Lakes Discovery Center Committee to plan and construct the Center, trails and other facilities.

4.1.2 Purchase and operate a travelers' information radio station to provide travelers information on the Refuge and the Great Lakes ecosystem. (RONS No. 97021)

4.1.3 Evaluate current Refuge theme and messages to determine if they are consistent with goals and objectives; modify if needed. Use this theme in brochures, interpretive signage, and other communications with the public.

4.1.4 Establish partnerships with support groups to assist with outreach events. Work with partners to participate in at least two outreach events each year that feature Refuge resources (e.g. International Migratory Bird Day, National Wildlife Refuge Week, National Fishing Week, Earth Day, etc.).

4.1.5 Develop a videotape of the Great Lakes Ecosystem. (RONS No. 97022)

4.2 Objective: Support and foster activities of the Friends of the Shiawassee National Wildlife Refuge.

Strategies:

4.2.1 Provide a meeting area and office space.

4.2.2 Provide a liaison between the Refuge and the Friends group.

4.2.3 Publically recognize and award the Friends group.

Goal 5: Protection

To protect the biological and cultural integrity of Refuge resources, the safety of visitors, and the health and safety of the Refuge staff.

5.1 Objective: Eliminate disturbance to fish, wildlife, habitat, and Refuge visitors caused by airboats, hydroplanes, personal watercraft (i.e. craft propelled by jet of water), and water skiers on rivers and tributaries within Refuge boundaries.

Strategies:

5.1.1 Work with Regional Office and Field Solicitor to establish surface water use controls and regulations on the rivers and tributaries within Refuge boundaries in order to protect Refuge resources.

5.1.2 Cooperate with partners (e.g. State, County, MUCC) to solve the disturbance and safety issues related to these craft.

5.2 Objective: Protect the cultural, historic, and prehistoric resources of lands owned and managed by the Refuge.

Strategies:

5.2.1 Establish a plan to fulfill requirements of Section 14 of the Archaeological Resources Protection Act for surveying lands to identify archeological resources; and Section 110(a)(2) of the National Historic Preservation Act for a preservation program. Due to deeply buried sites on Shiawassee National Wildlife Refuge, the plan needs a geomorphological component. Submit a RONS project to contract for the survey, estimated $100,000. (There is no time limit on meeting the mandated requirements.) (RONS No. 00003)

5.2.2 Permit cultural resources studies in the public interest. Work performed under an Archaeological Resources Protection Act permit may be subject to management restrictions but is compatible with the purposes for which the Refuge was established. Requests for archeological permits are forwarded to the Regional Director.

5.3 Objective: On the average, provide 40 hours per week of field law enforcement that includes weekends and evenings.

Strategies:

5.3.1 Add one full-time Refuge officer to the staff. (RONS No. 98002)

5.3.2 Maintain at least one collateral duty Refuge officer.

5.3.3 Purchase a law enforcement vehicle and construct a facility to house equipment and vehicle. (RONS No. 98001)

5.3.4 Add a seasonal law enforcement officer. (RONS No. 00006)

5.4 Objective: A safe and sanitary work environment for Refuge staff.

Strategy:

5.4.1 Install a water treatment system at the Refuge maintenance facility. (RONS No. 00011)

Goal 6: Private Lands

Through voluntary partnerships with private landowners, corporations, and conservation groups, restore and enhance wetland and grassland habitats and improve water quality within the Refuge watershed and Private Lands Coordination Area to benefit fish and wildlife in a manner that is compatible with a healthy ecosystem.

6.1 Objective: Annually restore 300 acres of wetlands and grasslands and 1 mile of stream and riparian corridor habitat for waterfowl, shore and water birds, and other migratory species within the 22-county Private Lands Coordination Area through the Partners For Fish and Wildlife Program.

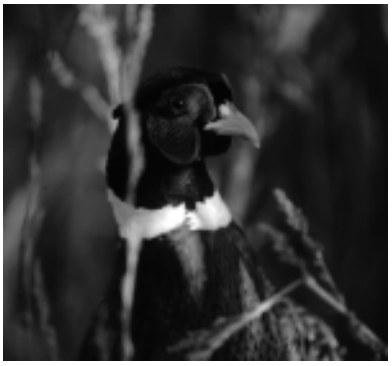


Photo by Myles Willard

Strategies:

6.1.1 Increase the Partners for Fish and Wildlife staff from one existing full-time biologist to two full-time biologists to better handle the existing and future private lands restoration workload. (RONS No. 00009)

6.1.2 Develop and maintain partnerships with 50 percent of the Soil and Water Conservation Districts in the 22-county Private Lands Coordination Area and locally sponsored sub-watershed projects to restore wetlands, grasslands, riparian and instream fish habitat for Service trust resources.

6.1.3 Continue partnerships with participating Soil and Water Conservation Districts, Local Pheasants Forever chapters, Michigan Wildlife Habitat Foundation, Michigan Duck Hunters Association, and other cooperating private conservation organizations, the Great Lakes Regional Office of Ducks Unlimited, Inc., Michigan DNR, Natural Resources Conservation Service and the Service's State Coordinator's Office.

6.2 Objective: By 2015, reduce sediment loads (as measured by the USDA) 10 percent within the watershed of the Refuge by use of filter strips and other conservation practices sponsored by the USDA within the Saginaw Bay Watershed.

Strategies:

6.2.1 In partnership with USDA's Natural Resource Conservation Service and Farm Service Agency, Conservation Reserve Program, Wetland Reserve Program, Wildlife Habitat Incentive Program and Environmental Quality Incentive Program, encourage farmers to use practices that improve water quality and reduce erosion and sedimentation levels on farm lands, including the practice of Integrated Crop Management and reducing the use of harmful herbicides and insecticides. Implement the voluntary projects fully using the programs of the partners, Michigan DNR, EPA's joint 319 Small Watershed Projects program, the Service's Private Lands Challenge Grant program, the Clean Water Initiative, and Instream Fish Habitat grant programs.

6.2.2 Provide technical assistance to USDA for the CRP, WRP, WHIP, EQIP and other Farm Bill programs to promote the use of environmentally sensitive farm practices.

6.2.3 Work with State, Federal and Local agencies and private conservation organizations to support and promote the 22-county Saginaw Bay Watershed through active involvement in the Saginaw Bay Resource, Conservation and Development Council, Saginaw Bay Watershed Initiative Network, the North American Waterfowl Management Plan and other conservation organizations and granting institutions. These groups provide long-term program guidance and on-the-ground projects within the Saginaw Bay Watershed to restore fish and wildlife habitat and improve water quality in the watershed.

6.2.4 Assist the Michigan DNR and the Michigan Habitat Partners group in the development and distribution of a Wildlife Habitat Manual for private land owners. The manual will be distributed statewide and consist of 70 chapters, each four pages long, describing desirable land and animal management practices.

6.2.5 Promote the restoration of wetlands, grasslands and filter strips within the Refuge watershed through the NRCS, Wetland Reserve Program and Farm Service Agencies, CRP, WHIP, EQIP and farm debt retirement programs.

Goal 7: Conservation Easements

Manage the 113 Conservation Easements in the Shiawassee Fish and Wildlife Management District to improve wildlife habitat for migratory birds and other fish and wildlife species.

7.1 Objective: Meet Service policy guidelines ("Administration and Enforcement Procedures for Conservation Easement") for 54 easements by 2005, for all easements by 2010.

Strategies:

7.1.1 Complete legal surveys on 50 percent (54 tracts) of all Conservation Easements by 2005 through contracted services. Complete contracted surveys on the remaining tracts by 2010. (RONS No. 00005)

7.1.2 Conduct annual inspections of all Conservation Easements.

7.1.3 Develop Land Use Plans for 50 percent (54 tracts) of the Conservation Easements and restore grassland and wetland habitats on 25 percent of these tracts by 2005.

7.1.4 Hire a permanent 6-month law enforcement officer to conduct annual inspections, develop land use plans, and restore wetland and grassland habitat projects. (RONS No. 00006)

Mosquito Control

Since our Environmental Assessment for the additions to the Refuge was written in 1996, the Refuge System Improvement Act has passed, and that Act and the resulting policy have caused us to re-examine our activities on the Refuge. In addition, in the summer of 1999 Region 3 closely examined the mosquito control policy at Minnesota Valley National Wildlife Refuge, a refuge within the Minneapolis-St. Paul metropolitan area.

Photo by Ed DeVries

Since 1988, Minnesota Valley National Wildlife Refuge has prohibited treatment of its lands for mosquitoes except in the case of a health emergency. The policy was implemented at Minnesota Valley after the Defenders of Wildlife and other environmental organizations filed a suit against the Service for allowing control of mosquitoes on Refuge lands. An out-of-court settlement was reached after the Service agreed to conduct an environmental review of its program. Following the completion of an environmental assessment and because of potential negative environmental effects, the Service adopted a policy where treatment on Minnesota Valley National Wildlife Refuge could only occur in the case of a human health emergency. Since the policy was adopted, there has not been a human health emergency associated with mosquitoes on the Refuge.

The Improvement Act made it clear that wildlife are first on refuges.

The Improvement Act states that "the Secretary shall not ... renew or extend an existing use of a refuge, unless the Secretary has determined that the use is a compatible use and that the use is not inconsistent with public safety. The Secretary may make the determinations referred to in this paragraph for a refuge concurrently with development of a conservation plan ..."

Based on the requirements of the Improvement Act and the experience and evaluation of the program at Minnesota Valley National Wildlife Refuge, Region 3 has decided to prohibit treatment of refuge lands for mosquitoes except in the event of an emergency when there is a real and imminent threat to human health.

The Improvement Act says that the Secretary shall not extend a use unless the use is not inconsistent with public safety. We think that eliminating the current mosquito control program is not inconsistent with public safety.

We think the threat of disease is very low. There are three different types of mosquito-borne viruses in Michigan that cause encephalitis in people. All are very rare. Eastern equine encephalitis occurs in counties of southern Lower Michigan. There have been seven human cases in Michigan in the last 20 years. St. Louis encephalitis primarily occurs in the southern United States. The only recorded outbreak in Michigan occurred in 1975, when 93 human cases and three deaths occurred primarily in the metropolitan area of southeastern Lower Michigan. This outbreak was part of a larger epidemic that covered most of the eastern United States. California encephalitis (La Crosse) is very

rare in Michigan. Two documented cases have been reported in Michigan since 1980. The mosquito responsible for transmitting the virus is a tree hole and tire-breeding species. The habitat for this mosquito is upland, mature deciduous forest and settings where discarded tires are allowed to accumulate and collect water (Walker, 2000).

Policy

Therefore, the policy of Region 3, U.S. Fish and Wildlife Service is to prohibit treatment of Shiawassee National Wildlife Refuge lands for mosquitoes except in the case of an emergency when there is a real and imminent threat to human health. The Refuge will continue to cooperate with the Saginaw County Mosquito Abatement Commission in the monitoring of mosquito populations on Refuge lands and in the removal of tires or other debris that serve as artificial breeding sites.

Determination of Human Health Emergency

For purposes of treatment of refuge lands for disease-carrying mosquitoes, a human health emergency will be determined by the Regional Director of the U.S. Fish and Wildlife Service in consultation with the U.S. Center for Disease Control, the Michigan Department of Community Health and other recognized health care professionals.

Responsibility for Prescription of Treatment of Refuge Lands

Once the Regional Director has determined the existence of a human health emergency, he or she will prescribe, in consultation with recognized biologists and entomologists, the type and duration of treatment for mosquitoes on refuge lands.

Implementation of the Policy

Prior to the mosquito season, the refuge manager will identify biologists and entomologists that have expertise in mosquitoes and agree to consult with the refuge during possible human health emergencies. We anticipate that these experts will come from universities and state government agencies within Michigan.